

REMARKS

Claims 10-14, 31-34 and 36-38 have been examined. Claims 10, 31, 32 and 34 have been amended. Claim 36 has been canceled. Reconsideration of the claims, as amended, is respectfully requested.

Claim Rejections - 35 U.S.C. §112

Claims 10-14, 34 and 36-38 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite. In particular, claims 10-14 and 36-38 were rejected for lacking antecedent basis for "the same axis of symmetry." Claim 10 has been amended to provide proper antecedent basis for this limitation. Hence, this rejection is overcome.

Claim 34 was rejected for using the limitation "the front surface." Claim 34 has been amended to correct a typographical error and to recite that the front surface is the top surface. Hence, this rejection is overcome.

Claim Rejections - 35 U.S.C. §102

Claims 10 and 12 have been rejected under 35 U.S.C. §102(e) as being anticipated by Fleischman. This rejection is respectfully traversed in part and overcome in part.

As presently pending, claim 10 claims a vibratable aperture plate having a plurality of apertures which each include a tapered portion and a flared portion. These two portions are configured such that when a liquid is supplied to the bottom surface of the plate body and the aperture plate is vibrated, liquid droplets are ejected through the flared portion.

In contrast to the vibratable aperture plate of claim 10, the Fleischman patent fails to disclose a vibratable aperture plate. Rather, the Fleischman patent describes a plate having venturi-like orifices that are used to measure flow with minimal pressure losses. See, for example, col. 7, lines 60-64. Nowhere in the Fleischman patent is there any discussion of a vibratable aperture plate that is employed to eject liquid droplets upon vibration of the aperture plate. Hence, claim 10 is distinguishable for at least these reasons.

However, in order to expedite prosecution, claim 10 has further been amended to recite that the plate body is electroformed to produce the apertures and that the tapered portion has a size in the range from about 1 micron to about 10 microns at the intersection with the flared portion. Because the Fleischman patent fails to disclose any size limitations of its apertures, it does not anticipate claim 10. Hence, claim 10 as amended is distinguishable over the Fleischman patent for this additional reason.

Applicants also note that the Office Action has recited the *In re Aller* case for the proposition that, "It would have been obvious to one having ordinary skill in the art at the time the invention was made to ranges as claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art."

With the present invention as claimed in claim 10, one of skill in the art would not have been able to use routine engineering to obtain the claimed ranges of about 1 micron to about 10 microns for the tapered portion. More specifically, the Fleischman patent does not describe the use of its plate for producing liquid droplets, and therefore does not describe any type of vibrations applied to the aperture plate to produce such droplets. Rather, as previously described, the apertures used in the Fleischman patent are used as a flow measurement device. Hence, one of skill in the art having the Fleischman patent would be searching for ranges that would optimize flow measurement while minimizing pressure losses. This has essentially nothing to do with providing apertures that would permit liquid droplets to be ejected through the flared portion when the aperture plate is vibrated. Hence, any experimentation by one skilled in the art would produce apertures particularly sized to enhance flow measurement, and not for ejecting liquid droplets as claimed in claim 10. Therefore, for this additional reason, claim 10 is distinguishable over the Fleischman patent. Claim 12 depends from claim 10 and is distinguishable for at least this additional reason.

Claim Rejections - 35 U.S.C. §103

Claims 31-34 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Dobo. This rejection is respectfully traversed in part and overcome in part.

As presently pending, claim 31 claims an aperture plate having a plurality of apertures which have a concave portion and a tapered portion. Further, the aperture plate is configured such that when a liquid is supplied to the top surface and the aperture plate is vibrated, liquid passes through the upper portion of the aperture and is ejected through the lower portion as a liquid droplet.

In contrast to the aperture plate of claim 31, the Dobo patent describes an orifice assembly that is configured for extruding filaments. Hence, the Dobo patent fails to describe any type of aperture plate having a plurality of apertures that may be vibrated to eject liquid droplets in the manner claimed in claim 31. Hence, claim 31 is distinguishable without amendment.

However, in order to expedite prosecution, claim 31 has been amended to recite that the aperture plate is vibratable, that the plate body is electroformed to produce the apertures, and that the upper portion has a size in the range from about 1 micron to about 10 microns where it intersects with the lower portion.

Nowhere in the Dobo patent is there any description of size ranges, much less the size range of about 1 micron to about 10 microns as claimed. Hence, claim 31 as amended is distinguishable for this additional reason.

Applicants note the statement in the Office Action that it would have been obvious to one of skill in the art to discover optimum or workable ranges. Applicants respectfully disagree. As previously mentioned, the Dobo patent describes a device for extruding materials and nowhere teaches or suggests vibrating the aperture plate to eject liquid droplets. Hence, one of skill in the art with possession of the Dobo patent would be taught a method of optimizing ranges so that the extrusion process could be optimized. This is far different than sizing apertures that may be used to produce liquid droplets when the aperture plate is vibrated. Hence, one of skill in the art would have no teaching or suggestion about the appropriate size ranges for producing liquid droplets when the aperture plate is vibrated. Hence, claim 31 is distinguishable for this additional reason.

Claims 32-34 depend from claim 31 and are distinguishable for at least the reasons recited in connection with claim 31. Further, claims 32 and 33 describe size ranges that are not taught or suggested in the Dobo patent. For example, claim 32 describes an angle of taper that is from about 30 to about 60 degrees. In contrast, the Dobo patent describes a critical angle of about 4 to 12 degrees. As previously described, no amount of experimenting would provide the size ranges claimed in claim 32 because one of skill in the art would be attempting to optimize an angle to enhance the extrusion process. Further, claim 33 describes limitations that are clearly not taught or suggested in the Dobo patent. Hence, these claims are distinguishable for this additional reason.

Claims 11, 13, 14, 36 and 38 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Fleischman. Claims 11, 13 and 38 depend from claim 10 and are distinguishable over the Fleischman patent for at least the reasons previously described. Further, Applicants respectfully disagree that one of skill in the art in possession of the Fleischman patent would be taught to use materials such as palladium, palladium nickel or palladium alloys. Hence, claim 11 is distinguishable for this additional reason. Further, claims 14 and 38 describe size ranges which are not taught or suggested by the Fleischman patent and would not have been within the ordinary skill of one in the art because of the teachings of Fleischman which relate to flow measurement rather than ejecting liquid droplets. Hence, these claims are distinguishable for this additional reason.

CONCLUSION

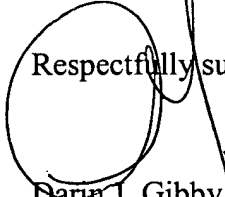
In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

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PATENT

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,


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